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FINAL

VIENNA PCE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY:
PROJECT GOALS AND OBJECTIVES

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1.0 INTRODUCTION

The purpose of this document is to identify the goals and objectives for the Vienna Tetrachloroethylene (PCE) Superfund Site (the Site) Remedial Investigation (RI) and Feasibility Study or Engineering Evaluation and Cost Analysis (FS), establish preliminary project requirements, and provide the groundwork for more detailed project planning documents. These detailed planning documents will include the Site Management Plan, which is comprised of the Field Sampling Plan, Quality Assurance Project Plan, Data Management Plan, Pollution Control and Mitigation Plan, and the Health and Safety Plan. With the exception of the Risk Assessment Plan, these detailed planning documents are being submitted concurrently with this goals and objectives document. As specified in the approved assignment work plan, the Risk Assessment Plan will be submitted as part of the Technical Letter Report upon receipt of the groundwater sampling results.

2.0 GOALS AND OBJECTIVES

The primary goal and objective of this work assignment is to perform the RI/FS activities at the Vienna PCE site (the Site). These RI/FS activities include: 1) the design, planning, and completion of the field investigation; 2) the preparation of a human health risk assessment and a screening level Ecological Effects Evaluation; 3) the provision of analytical support, data validation, and data evaluation; and, 4) the completion of the FS. The overall goal of the RI/FS is to determine the nature and extent of groundwater contamination at the site and to select a remedy to eliminate, reduce, or control risks to human health and the environment. The goal is to be achieved with the minimum amount of data necessary to support the selection of an approach for site remediation and then to use this data in a well supported Record of Decision (ROD). The RI portion of the study will focus on collecting adequate data to define the nature and extent of contamination at the site. The Risk Assessment (RA) will evaluate the risk to public health and the environment related to contamination identified during the RI. The FS portion of the study will investigate alternatives which could be implemented to remediate contamination at the site.

The scope for the RI field investigation was detailed in the Work Assignment Statement of Work and was further defined in the CDM Federal Programs Corporation (CDM Federal) Work Plan for this assignment. This Work Plan was approved by EPA on April 5, 2000. During the investigation, existing monitoring wells will be screened for suitability for continued sampling, and groundwater samples will be collected from the suitable existing monitoring wells as well as from upwards of thirty new monitoring wells (placement to be determined via a Cone Penetrometer Technology (CPT) investigation of contaminated groundwater). Using the results of the sampling, a screening-level Ecological Effects Evaluation will be completed for the river and onsite terrestrial habitats. Based on the results of the screening level ecological risk assessments, an in-depth ecological investigation may be conducted which may include habitat delineation, wetland delineation, collection of biota and bioassay samples and completion of a baseline Ecological Risk Assessment (ERA).

3.0 DATA NEEDS AND DATA QUALITY OBJECTIVES

The Data Quality Objective (DQO) process is a series of planning steps based on the scientific method that are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended purpose. The development of DQOs focuses on the end use of the collected data and on determining the degree of certainty with respect to precision, accuracy, representativeness, completeness, and comparability (PARCC) necessary to satisfy the end use.

The EPA document "Guidance for the Data Quality Objectives Process," EPA 1994, provides guidance for the development of site specific DQOs. The DQO process is intended to:

- clarify the study objectives;
- define the most appropriate type of data to collect;
- define the most appropriate conditions from which to collect the data; and
- specify acceptable levels of decision errors that will be used as the basis for establishing the quantity and quality of data needed to support the design.

The DQO process specifies project decisions, the data quality required to support those decisions, specific data types needed, data collection requirements, and analytical methods necessary to generate the specified data quality. The process also ensures that the resources required to generate the data are justified. DQOs developed during the planning stages of this project will be referenced throughout various planning documents and used during the implementation of the project. DQO development is a seven step process whereby the output from each step influences the decisions that will be made later in the process. The seven steps are:

Step 1: State the problem;
Step 2: Identify the decisions;
Step 3: Identify the inputs to the decision;

Step 4: Define the study boundaries;

Step 5: Develop the decision rule;

Step 6: Specify tolerable limits on decision errors; and

Step 7: Optimize the design.

During the first six steps of the DQO process performance criteria will be developed that will be used to develop the data collection design. The final step of the process involves the specific development and refinement of the data collection design based on the DQOs. A brief discussion of steps and their application to this project is provided below.

Step 1: State the Problem

The purpose of this step is to describe the problem to be studied so that the focus of the study will be unambiguous. Previous investigations and inspections of the Vienna PCE area identified groundwater primarily contaminated with PCE.

The city of Vienna is currently supplied by eight municipal supply wells, which draw water from the aquifer underlying the city. Prior to 1995 the city of Vienna was supplied by 12 municipal wells, all of which are located in five clusters throughout the city. PCE was initially detected in four municipal supply wells in February 1992, and two more municipal supply wells in September 1992. All six wells with PCE contamination are no longer in service. In order to keep up with the demand for water, the city installed two new wells in 1995, and brought the two new wells online in 1997. The following is a summary of the findings regarding the Vienna PCE site.

PCE contamination was first detected in February 1992 at Municipal Wells 1 through 4, located at City Hall. The highest concentrations of PCE detected in wells 1 through 4 were 170, 390, 8, and 7 micrograms per liter (µg/l), respectively. These samples were collected by the city on June 2, 1992, and the city of Vienna discontinued the use of these wells on June 11, 1992.

Municipal Wells 5 and 6 are located approximately 1000 feet northwest of City Hall and Municipal Wells 1 through 4. Municipal Wells 5 and 6 were removed from service in 1991, prior to detection of PCE, due to benzene leaking from an underground storage tank (UST). Groundwater samples collected from these wells by West Virginia Department of Environmental Protection (WVDEP) on September 22 and 24, 1992 had PCE concentrations of 70 µg/l and 0.5 µg/l, respectively. 1

In May 1993 and 1994, EPA Response, Engineering, and Analytical Contract (REAC) personnel completed two phases of investigation at the site. The first phase of the investigation consisted of a soil gas survey to assess the source(s) and extent of contamination in the subsurface. The second phase of the investigation consisted of installing, developing, and sampling four groundwater monitoring wells (ERT-1 through ERT-4) located within the contaminated aquifer (see Figure 2-1). The primary contaminant found at the site was PCE with very few degradation by-products. REAC personnel installed and tested two exploratory wells (ERT-5 and ERT-6) in the area suspected to be free of contamination to evaluate their suitability for use as new municipal supply wells.

In March and May 1997, EPA REAC conducted additional rounds of groundwater sampling from monitoring and municipal supply wells located in the vicinity of the Vienna and Busy Bee Cleaners. This included two deep wells, VC-1 and VC-2, installed on the Vienna Cleaners property. The PCE detected in monitoring wells ERT-3, adjacent to Busy Bee Cleaners, and VC-2, and ERT-4 located adjacent to Vienna Cleaners, ranged from 6,950 µg/l detected from VC-2, to130 µg/l detected from ERT-3.

The REAC investigations identified a PCE plume in the soil gas and groundwater extending from just north of the Vienna Cleaners to the south as far as the intersection of Grand Central Avenue and 27th Street. The highest PCE concentrations were found, in both soil gas and groundwater, in the vicinity of the Vienna Cleaners and the Busy Bee Cleaners. The highest PCE groundwater

concentrations adjacent to each source were present in ERT-3 (787 µg/l) and in VC-2 (6,950 µg/l). As a result, the contamination is assumed to have originated from these facilities.

The city of Vienna is concerned about future PCE contamination, because other municipal supply wells appear to be hydraulically downgradient from the currently contaminated wells.

The extent and full nature of contamination at this site have not been fully delineated. Sufficient information on onsite sources and types of contamination have been collected. Final contaminant migration pathways have not been identified.

Step 2: Identify the Decision

The goal of the RI is to characterize the nature and extent of site-related contamination in the groundwater. The data generated from the investigation will be used to support a risk assessment and provide information for an initial evaluation of appropriate remediation technologies. The determination regarding whether a feasibility study or EE/CA will be performed will be made by EPA after the first round of groundwater sample data are available. The principal study questions are:

- Does contamination at or adjacent to the site pose a risk to ecological and human receptors.
- What is the nature and extent of groundwater contamination at the site?

The following resolution to the questions and possible actions have been identified:

Questions 1 and 2

- Prepare human health risk assessments on current site conditions.
- Prepare a screening level ecological effects evaluation.

- Chemical and hydrogeologic data collected during the initial CPT groundwater sampling and subsequent monitoring well sampling will define the nature and extent of groundwater contamination.
- Utilize groundwater sampling data to determine whether a feasibility study or a EE/CA will be performed.

Step 3: Identify the Inputs to the Decision

The purpose of this step is to identify the information and data that need to be obtained and the measurements that need to be taken to resolve the decision statement. Based on the question presented in Step 1, the following information is required:

Chemical analysis of groundwater samples (target compound list (TCL) organics, target analyte list (TAL) inorganics including cyanide, and natural attenuation parameters) as well as elevation and hydraulic data are needed to confirm the nature and extent of groundwater contamination.

The main source of the chemical characterization information required will be the analytical results from the proposed groundwater sampling and historical data including regional background concentrations. The main sources of information used to assess impact to human and ecological receptors are screening levels obtained from EPA documents. In EPA Region III the screening levels include the Risk-Based Concentrations (RBCs). The screening levels are considered the preliminary remediation goals (PRG) for this study.

The selected analytical methods for the initial investigation will have standard quantitation limits as found in the USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Low Concentration Water, OLC02.1, for volatile organics only, USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, OLM04.2, for semi-volatile organic compound (SVOC) and Pest/PCB analyses, and USEPA

Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, ILM04.0.

These quantitation limits will provide information to determine the boundaries of the groundwater contaminant plume and will meet the risk based DQOs. The historical data from REAC identified the source of the contamination, and the potential contaminants of concern. The data available are at levels above the Region III RBC's. In order to define the boundaries of the groundwater contaminant plume and to meet the risk based DQO's, the quantitation limits identified in USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Low Concentration Water, OLC02.1, will be used.

Step 4: Define the Boundaries of the Study

This step defines the spatial and temporal boundaries of the study.

The horizontal spatial boundaries of the study area include the city of Vienna and the surrounding residential and commercial areas located around the PCE groundwater contaminant plume. The boundaries of the study area will be developed during the CPT groundwater sampling phase of the study. The vertical spatial boundaries are from ground surface to a depth of 50 feet into the competent bedrock which begins from 80 to 100 feet below ground surface. This study focuses on current conditions and, therefore, temporal boundaries include the time frame for the RI (2000 to 2002). The main data used for decision-making will be collected from current conditions although the contamination may have been historically deposited. The populations needed for decision-making for this investigation include the chemical concentrations (including both detected and non-detected values) for all media sampled and analyzed. Constraints that could potentially interfere with data collection are physically inaccessible sampling locations and a limited number of sampling events.

Step 5: Develop a Decision Rule

The purpose of this step is to define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing among alternative actions. During the course of the project the tasks outlined in the Site Management Plan (SMP) will be followed. While performing the tasks decisions will be made to collect sufficient data and maintain the progress of the assignment. Several example logic statements are presented below that will help guide the Vienna PCE project.

- If residential wells are identified within a 0.25 mile radius of the site, then the U.S. EPA will be provided the information and the Agency will decide if they shall be sampled.
- If field parameters stabilize to within limits defined in Section 4.6 in the SMP during purging, then a groundwater sample will be collected.
- If levels above background are identified during CPT sampling at the edge of the sampling grid, the grid will be extended outwards another 200 feet, and another sample will be collected. The process will be repeated until two "clean" samples are collected for each sampling depth.
- If the CPT rig hits refusal above bedrock, the rig will offset once and attempt to resample beginning at the depth of refusal.
- If gross contamination (e.g., unusual colors and high photoionization detector (PID) readings) is noted during CPT groundwater sampling or during monitoring well installation, the U.S. EPA will be notified and a course of action will be determined.

The parameters of interest are the concentrations of constituents identified for the groundwater. These concentrations should estimate the true values of the constituents and may be used on an individual (i.e., PCE) basis or cumulatively (i.e., total polycyclic aromatic hydrocarbons). The action levels for each constituent may be a permitted limit, background concentration, or risk

based concentrations. Logic statements for the risk assessment portion of the project are presented below.

- If the maximum chemical concentration exceeds the screening level, then the chemical will be evaluated in the Baseline Risk Assessment (BLRA).
- If the BLRA shows that a chemical's risks exceeds the acceptable risk level, then EPA will determine if the site will be evaluated via a FS.
- If distribution testing shows the chemical follows a normal distribution, then the normal upper confidence limit (UCL) will be calculated.
- If the nature and extent of contamination has been properly defined and the human health risk assessment (HHRA) is sufficiently comprehensive, then a proper remedial action may be chosen for the site.

Standard rounding rules will apply. If the figure following those to be retained is less than five, round it down. If the figure is greater than five, drop it and increase the last digit to be retained by one (i.e., round up). If the figure following the last digit to be retained equals five and there are no digits to the right of the five or all of the digits to the right of the five equal zero, then increase the digit to be retained by one if the digit to be retained is odd, or retain the digit if the digit is even. For example, if the figure to be rounded is 11.25, the number would be rounded to 11.2, or if the figure is 11.35, the number would be rounded to 11.4.

Step 6: Specify Tolerable Limits on Decision Errors

Decision maker's tolerable limits on decision errors, which are used to establish performance goals for the data collection design, are specified in this step. Decision makers are interested in knowing the true value of the constituent concentrations. Since analytical data can only estimate these values, decisions that are based on measurement data could be in error (decision error). Two reasons why the decision maker may not know the true value of the constituent concentration follow:

(1) Concentrations may vary over time and space. Limited sampling may miss some features of this natural variation because it is usually impossible or impractical to measure every point of a population. *Sampling design error* occurs when the sampling design is unable to capture the complete extent of natural variability that exists in the true state of the environment.

(2) Analytical methods and instruments are never absolutely perfect, hence a measurement can only estimate the true value of an environmental sample. *Measurement error* refers to a combination of random and systematic errors that inevitably arise during the various steps to the measurement process.

The combination of sampling design and measurement errors is the total study error. Since it is impossible to completely eliminate total study error, basing decisions on sample concentrations may lead to a decision error. The probability of decision error is controlled by adopting a scientific approach in which the data are used to select between one condition (the null hypothesis) and another (the alternative hypothesis). The null hypothesis is presumed to be true in the absence of evidence to the contrary. For this project the null hypothesis is that the true values of the constituents are below the action levels. The alternative hypothesis is that the true values of the constituents are above the action levels.

The closer the reported concentration is to the action level, the higher the probability that an incorrect decision will be made and, therefore, there is a "gray region" surrounding the action level. To provide a factor of safety and reduce or eliminate an incorrect decision, the maximum concentration is used to screen the data.

Step 7: Optimize the Design for Obtaining Data

This step identifies a resource-effective data collection design for generating data that are expected to satisfy the DQOs. The data collection design (sampling program) is described in detail in Part I of the Field Sampling Plan (the Sampling and Analysis Plan).

4.0 OBJECTIVES AND POTENTIAL ALTERNATIVES

The primary objective of the alternative(s) which will ultimately be selected for the Site is the reduction of any identified potential risk to human health and the environment to acceptable levels. A number of secondary objectives may also warrant consideration for this site. These objectives may include:

- Limit or disallow use of groundwater;
- Restore groundwater to risk-based levels;
- Restore the site area to regulatory standards; and,
- Restore site area to approximate pre-disposal (e.g., to non-contaminated) conditions.

It should be noted that while some of these secondary objectives are mutually exclusive, a balance between the objectives may be struck which can best serve the community and the environment.

With consideration being given to both the primary and potential secondary objectives, a preliminary list of potential remedial alternatives/technologies has been developed and is presented below:

No Action
Limited Action: Monitoring, Access Restrictions
Containment: Cap (prevent infiltration)
Containment: Vertical barriers
Monitored Natural Attenuation
In-situ physical/chemical/biological treatment
Collection, physical/chemical treatment, with onsite discharge
Collection, physical/chemical treatment, with offsite discharge

This list of alternatives/technologies has been developed as a starting point for the RI/FS process; it is not intended to eliminate potentially viable alternatives, but to ensure the collection of data for what are considered to be the most promising alternatives given the limited amount of site data currently available. The list was developed under the assumption that the primary contaminants of concern associated with the greatest volume of waste will be volatile organics.

5.0 POSSIBLE TREATABILITY STUDIES

Based on the available information and the current site conditions, EPA has determined that the evaluation and development of potentially applicable treatability studies is not warranted at this phase of the RI/FS. If remedial technologies are identified during the Remedial Alternatives Screening which require treatability testing, EPA will re-evaluate the need for treatability studies. If it is determined that these studies are necessary, CDM Federal will develop a work plan that identifies the technologies to be tested and the methodologies required to complete the tests.

6.0 PRELIMINARY IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND/OR STANDARDS

This section provides a preliminary determination of the regulations that are potentially applicable or relevant and appropriate to the remediation of the Vienna PCE site. The ARARs identified are preliminary and will be refined during the course of the RI/FS as additional information is gathered. Both federal and state environmental and public health requirements are considered. In addition, this section presents an identification of federal and state criteria, advisories, and guidance that could be used for evaluating remedial alternatives.

6.1 DEFINITION OF ARARs

The legal requirements that are relevant to the remediation of the Vienna PCE Site are identified and discussed using the framework and terminology of Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). These acts specify that Superfund remedial actions must comply with the requirements and standards of both federal and state environmental laws.

EPA defines applicable requirements as "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site". An applicable requirement must directly and fully address the situation at the site.

EPA defines relevant and appropriate requirements as "those cleanup standards, standards of control, or other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at

CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site".

Actions must comply with state ARARs that are more stringent than federal ARARs. State ARARs are also used in the absence of a federal ARAR, or where a state ARAR is broader in scope than the federal ARAR. In order to qualify as an ARAR, state requirements must be promulgated and identified in a timely manner. Furthermore, for a state requirement to be a potential ARAR it must be applicable to all remedial situations described in the requirement, not just CERCLA sites.

ARARs are not currently available for every chemical, location, or action that may be encountered. When ARARs are not available, remediation goals may be based upon other federal or state criteria, advisories and guidance, or local ordinances. In the development of remedial action alternatives the information derived from these sources is termed "To Be Considered" and the resulting requirements are referred to as TBCs. EPA guidance allows clean-up goals to be based upon non-promulgated criteria and advisories such as reference doses when ARARs do not exist, or when an ARAR alone would not be sufficiently protective in the given circumstance.

By contrast, there are six conditions under which compliance with ARARs may be waived. Remedial actions performed under Superfund authority must comply with ARARS except in the following circumstances: (1) the remedial action is an interim measure or a portion of the total remedy which will attain the standard upon completion; (2) compliance with the requirement could result in greater risk to human health and the environment than alternative options; (3) compliance is technically impractical from an engineering perspective; (4) the remedial action will attain an equivalent standard of performance; (5) the requirement has been promulgated by the state, but has not been consistently applied in similar circumstances; or (6) the remedial action would disrupt fund balancing.

Potential ARARs and TBCs are classified as chemical, action, or location specific. Chemical-specific ARARs or TBCs are usually health or risk-based numerical values, or methodologies which

when applied to site specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Location-specific ARARs or TBCs generally are restrictions imposed when remedial activities are performed in an environmentally sensitive area or special location. Some examples of special locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs or TBCs are restrictions placed on particular treatment or disposal technologies. Examples of action-specific ARARs are effluent discharge limits and hazardous waste manifest requirements.

6.2 CONSIDERATION OF ARARs DURING THE RI/FS

ARARs are used to determine the necessary extent of cleanup, to scope and formulate remedial action alternatives, and to govern the implementation of the selected alternative. The different ARAR classifications are considered at various points in a RI/FS. Chemical-specific ARARs are used early in the development of specific remediation goals. Location-specific ARARs may be developed throughout the study. Action-specific ARARs are addressed in the detailed evaluation of remedial alternatives and the selection of a preferred remedy.

Specifically, ARARs ("ARARs" here includes TBCs) will be considered during the following intervals of the RI/FS process:

- Scoping of the RI/FS. Chemical and location-specific ARARs will be identified on a preliminary basis.
- Site characterization and risk assessment phases of the RI. Chemical and location-specific ARARs will be identified comprehensively, and will be refined to determine site cleanup goals.
- Development of remedial alternatives in the FS report. Action-specific ARARs will be identified for each of the proposed alternatives and will be considered along with other ARARs.

- Detailed evaluation of alternatives in the FS reports. All potential ARARs identified up to this point will be examined to specifically identify a "package" of ARARs for each alternative. Each alternative will be evaluated to determine what is required to achieve compliance with the "package" of ARARs.
- Selection of remedy. Compliance with identified ARARs is used as a criterion for the selection of a remedial alternative. If necessary, the provisions for the waiver of ARARs will be considered.
- Remedial design. All technical specifications of the remedial design and proposed construction will be evaluated to ensure compliance with action-specific ARARs.

As the RI/FS process continues, the list of ARARs will be updated, particularly as guidances are issued by state and federal agencies. ARARs will be used as a guide to establish the appropriate extent of site cleanup; to aid in scoping, formulating and selecting proposed treatment technologies; and to govern the implementation and operation of the selected remedial alternative. Primary consideration should be given to remedial alternatives that attain or exceed the requirements of the identified ARARs. Throughout the RI/FS, ARARs are identified and utilized by taking into account the following:

- Contaminants suspected or identified to be at the site;
- Chemical analysis performed, or scheduled to be performed;
- Types of media (air, soil, ground water, surface water, and sediment);
- Geology and other site characteristics;
- Use of site resources and media;
- Potential contaminant transport mechanisms;
- Purpose and application of potential ARARs; and
- Remedial alternatives considered for site cleanup.

6.3 PRELIMINARY IDENTIFICATION OF ARARs AND TBCs

The National Contingency Plan (NCP) (55 Federal Register, March 8, 1990) and the SARA/CERCLA Compliance Policy guidance define applicable requirements as the federal and state requirements for hazardous substances, which would be legally binding at the site, if site response were to be undertaken regardless of CERCLA Sections 104 or 106. Relevant and appropriate requirements are defined as those federal and state requirements that, while not directly applicable, apply to facilities or problems similar to those encountered at this site. In other words, requirements may be relevant and appropriate if they would be applicable except for jurisdictional restrictions associated with the requirements. With respect to the selection of remedial alternatives, relevant and appropriate requirements are to be afforded the same weight and consideration as applicable requirements.

The following federal and state regulatory requirements are potentially applicable or relevant and appropriate to the site:

1) Chemical-Specific ARARs

Federal:

- Resource Conservation and Recovery Act (RCRA) Groundwater Protection Standards and Maximum Concentration Limits (40 CFR 264, Subpart F)
- Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)
- Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-.16)
- Hazardous Waste Identification Rule (40 CFR, November 30,1998)
- USEPA Region III Risk-Based Concentrations (April, 2000)
- Maximum Contaminant Level Goals (56 CFR 3256, January 30, 1991, 50 Federal Register 46936-47022, November 13, 1985)

West Virginia:

- West Virginia Regulation of Maximum Contaminant Levels (MCLs) in Water Systems (WVC 16-1-9a)
- West Virginia Specific Water Quality Criteria (§ 46-1-8).
- West Virginia Voluntary Remediation and Redevelopment Rule Remediation Standards (§ 60-3-9).

2) **Location-Specific ARARs**

Federal:

- Endangered Species Act of 1973 (16 USC 1531)
  (Generally, 50 CFR Parts 81,225, and 402)
- Executive Order on Wetlands Protection (CERCLA Wetlands Assessments) No. 11990
- National Historic Preservation Act (16 USC 470) Section 106 *et seq.* (36 CFR 800)
- Fish and Wildlife Coordination Act (16 USC 661 *et seq.*)
- Clean Water Act Section 404 and Rivers and Harbor Act Section 10 Requirements for Dredge and Fill Activities (40 CFR 230)

West Virginia:

- West Virginia Hazardous Waste Management Rules--Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (§ 33-20-7).
- West Virginia Requirements Governing Water Quality Standards Anti-Degradation Policy (§ 46-1-4).
- West Virginia Requirements Governing Water Quality Standards Water Use Categories (§ 46-1-6).

3) **Action-Specific ARARs**

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal Systems, (i.e., landfill, incinerators, tanks, containers, etc.) (40 CFR 264 and 265) (Minimum Technology Requirements)
- RCRA Subtitle C Closure and Post-Closure Standards (40 CFR 264, Subpart G)
- RCRA Ground Water Monitoring and Protection Standards (40 CFR 264, Subpart F)
- RCRA Manifesting, Transport and Recordkeeping Requirements (40 CFR 262)
- RCRA Wastewater Treatment System Standards (40 CFR 264, Subpart X)
- RCRA Storage Requirements (40 CFR 264; 40 CFR 265, Subparts I and J)
- RCRA Subtitle D Nonhazardous Waste Management Standards (40 CFR 257)
- Off-Site Transport of Hazardous Waste (EPA OSWER Directive 9834.11)
- Reinjection Requirements (EPA OSWER Directive 9234.1-06
- RCRA Excavation and Fugitive Dust Requirements (40 CFR 264.251 and 264.254)
- RCRA Land Disposal Restrictions (40 CFR 268) (On- and off-site disposal of excavated soil)
- Clean Water Act - NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
- Clean Water Act Discharge to Publicly Owned Treatment Works (POTW) (40 CFR 403)
- National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)
- DOT Rules for Hazardous Materials Transport (49 CFR 107,171.1-171.500)
- Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904,1910,1926)
- Fish and Wildlife Coordination Act (16 UC 661 et seq.). (Requires actions to protect fish or wildlife when diverting, channeling or modifying a stream.)

West Virginia:

- West Virginia Hazardous Waste Management Rules Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (§ 33-20-7).
- West Virginia Hazardous Waste Management Rules Standards Applicable to Transporters of Hazardous Waste (§ 33-20-6).
- West Virginia Hazardous Waste Management Rules Identification and Listing Of Hazardous Waste (§ 33-20-3).
- West Virginia Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities Universal Waste Rule (§ 33-20-13).
- West Virginia Hazardous Waste Management Land Disposal Restrictions (LDRs) (§ 33-20-10)
- Waste Load Allocations for Sewage Discharges (§ 47-11-6).

When ARARs do not exist for a particular chemical or remedial activity, other criteria, advisories and guidance (TBCs) may be useful in designing and selecting a remedial alternative. The following criteria, advisories and guidance were developed by EPA, other federal agencies and state agencies.

Federal TBCs (Action, Location, and Chemical-Specific):

- Proposed Federal Air Emission Standards for Volatile Organic Control Equipment (52 Federal Register 3748) (air stripper controls)
- USEPA Drinking Water Health Advisories
- USEPA Health Effects Assessment (HEAs)
- Toxic Substances Control Act (TSCA) Health Data
- Toxicological Profiles, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service

- Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 Federal Register 8711)
- Cancer Assessment Group (National Academy of Science) Guidance
- Ground Water Classification Guidelines
- Ground Water Protection Strategy
- Waste Load Allocation Procedures
- Proposed RCRA Corrective Action Regulations (July 27, 1990)

West Virginia TBCs (Action, Location, and Chemical-Specific):

- *Permitting Guide, West Virginia DEP*
- Ecological Assessment of the Northern Upper Ohio River, West Virginia DEP
- "Mountain State Monitor–Newsletter of West Virginia Citizen Stream Monitoring", West Virginia DEP, Fall 1998.
- "Riparian Habitat Assessment", West Virginia DEP, 1998.
- West Virginia Water Quality Assessment (305b Report), 1998.

6.4 PRELIMINARY SCOPING OF ARAR IMPACTS

The following are the ARARs that may significantly impact the selection of remedial alternatives for the various media at the Vienna PCE Site. This list of presently identified potential ARARs is based on current knowledge and will be reviewed throughout the RI/FS to: 1) assure that the ARARs identified at this preliminary stage are still applicable to potential remedial measures as more information about the site becomes available and 2) identify additional ARARs that may be appropriate.

Chemical-Specific

The determination of potential chemical-specific ARARs and TBC criteria for a site typically follows an examination of the nature and extent of contamination, potential migration pathways and

release mechanisms for site contaminants, the presence of human receptor populations, and the likelihood that exposure to site contaminants will occur. Information from previous investigations provides some of this basic information. Previous sampling events include the collection of surface soil, sediment, surface water, and waste samples.

Federal:

- Resource Conservation and Recovery Act (RCRA) Groundwater Protection Standards and Maximum Concentration Limits (40 CFR 264, Subpart F)
- Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)
- Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-16)
- RCRA TCLP and Land Ban Requirements for Landfilling (40 CFR 261)
- Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs)
- Maximum Contaminant Levels Goals (56 CFR 3256, January 30, 1991, 50 Federal Register 46936-47022, November 13, 1985)

West Virginia:

- West Virginia Regulation of Maximum Contaminant Levels (MCLs) in Water Systems (WVC 16-1-9a)
- West Virginia Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration (§ 45-14-1).
- West Virginia Specific Water Quality Criteria (§ 46-1-8).
- West Virginia National Pollution Discharge Elimination System (47 CSR 10).
- to Prevent and Control the Emissions of Toxic Air Pollutants (§ 45-27-1).
- West Virginia Hazardous Waste Management Land Disposal Restrictions (LDRs) (§ 33-20-10)
- West Virginia Voluntary Remediation and Redevelopment Rule Remediation Standards (§ 60-3-9).

Location-Specific

The location of the site is a fundamental determinant of its impact of human health and the environment. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location (EPA, 1988a). Some examples of these unique locations include: floodplains, wetlands, historic places, and sensitive ecosystems or habitats.

Federal:

- Executive Order on Wetlands Protection (CERCLA Wetlands Assessments) No. 11990
- Fish and Wildlife Coordination Act (16 USC 661 *et seq.*)
- Wetlands Construction and Management Procedures (40 CFR 6, Appendix A)
- Executive Order 11988 on Floodplain Management
- The National Historic Preservation Act
- Endangered Species Act

West Virginia:

- West Virginia Requirements Governing Water Quality Standards Anti-Degradation Policy (§ 46-1-4).
- West Virginia Requirements Governing Water Quality Standards Water Use Categories (§ 46-1-6).
- West Virginia Requirements Governing Water Quality Standards–Water Contact Recreation (46-1--Appendix D)
- West Virginia Hazardous Waste Management Rules Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (§ 33-20-7).

Action-Specific

Based on the identification of remedial response objectives and applicable general response actions, numerous federally promulgated action-specific ARARs and TBCs will affect the implementation of remedial measures and include administrative requirements related to treatment, storage and disposal actions.

The primary federal requirements which guide remediation are those established under CERCLA as amended by SARA. Requirements outlined in the current National Contingency Plan (NCP) (40 CFR 300.400(g)(3)) represent TBC criteria for the site. The NCP incorporates the SARA Title III requirement that alternatives must satisfy ARARs and utilize technologies that will provide a permanent reduction in the toxicity, mobility or volume of wastes, to the extent practicable.

RCRA establishes both administrative (e.g., permitting, manifesting) requirements and substantive (i.e., design and operation) requirements for remedial actions. For all CERCLA actions conducted entirely onsite, only the substantive requirements apply.

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal Systems, (i.e., landfill, incinerators, tanks, containers, etc.)(40 CFR 264 and 265) (Minimum Technology Requirements)
- RCRA Subtitle C Closure and Post-Closure Standards (40 CFR 264, Subpart G)
- RCRA Ground Water Monitoring and Protection Standards (40 CFR 264, Subpart F)
- RCRA Manifesting, Transport and Recordkeeping Requirements (40 CFR 262)
- RCRA Storage Requirements (40 CFR 264; 40 CFR 265, Subparts I and J)
- RCRA Subtitle D Nonhazardous Waste Management Standards (40 CFR 257)
- Off-Site transport of Hazardous Waste (EPA OSWER Directive 9834.11)
- RCRA Excavation and Fugitive Dust Requirements (40 CFR 264.251 and 264.254)

- RCRA Land Disposal Restrictions (40 CFR 268) (On- and off-site disposal of excavated soil)
- Hazardous Waste Identification Rule (40 CFR, November 30, 1998)
- Clean Water Act - NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
- Clean Water Act Discharge to Publicly Owned Treatment Works (POTW) (40 CFR 403)
- National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)
- DOT Rules for Hazardous Materials Transport (49 CFR 107,171.1-171.500)
- USEPA Region III Risk-Based Concentrations (April, 2000)
- Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904,1910,1926)
- Fish and Wildlife Coordination Act (16 UC 661 et seq.). (Requires actions to protect fish or wildlife when diverting, channeling or modifying a stream).
- Federal Insecticide, Fungicide and Rodenticide Act (40 CFR 165)

West Virginia:

- Hazardous Waste Management Rules--Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (§ 33-20-7)
- Hazardous Waste Management Rules--Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (§ 33-20-9).
- West Virginia National Pollutant Discharge Elimination System (NPDES) Program (§ 47-10)
- West Virginia Hazardous Waste Management Rules--Standards Applicable to Transporters of Hazardous Waste (§ 33-20-6).
- West Virginia Hazardous Waste Management Rules--Identification and Listing Of Hazardous Waste (§ 33-20-3).

- West Virginia Hazardous Waste Management Land Disposal Restrictions (LDRs) (§ 33-20-10)
- Waste Load Allocations for Sewage Discharges (§ 47-11-6).

In addition to the ARARs identified above, the following criteria, advisories and guidance (TBCs) may also have a significant impact on alternatives selected for the Vienna PCE Site.

Federal:

- USEPA Drinking Water Health Advisories
- USEPA Health Assessments
- Toxicological Profiles, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service
- Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 Federal Register 9016)
- Cancer Assessment Group (National Academy of Science) Guidance
- Ground Water Classification Guidelines
- Ground Water Protection Strategy
- Fish and Wildlife Coordination Act Advisories
- Federal Guidelines for Specification of Disposal Site for Dredged or Fill Material

7.0 NEPA REQUIREMENTS

EPA is exempted from the procedural requirements of National Environmental Policy Act (NEPA) for CERCLA response actions. It has been consistently recognized by the Courts that EPA procedures are functionally equivalent to the NEPA process and are thereby exempt from the procedural requirements in NEPA.

While EPA is exempt from NEPA requirements, the results of the RI could potentially indicate that the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) may be appropriate. EPA may find it beneficial to utilize an EA or EIS to comprehensively address large-scale ecological impacts, particularly cumulative impacts. This course of action may be found to be appropriate given the proximity of the Ohio River to sources of contamination.

8.0 CONCEPTUAL EXPOSURE PATHWAY ANALYSIS

The purpose of this section is to present a preliminary analysis of potential exposure pathways to be evaluated in the human health risk assessment for the Site.

PCE has been detected in municipal drinking water wells. Twelve municipal water supply wells, located throughout the city, are in the affected area. Within the area to be evaluated, two facilities have been identified as being probable sources of groundwater contamination and are considered to be potential responsible parties (PRPs). These facilities are Vienna Cleaners and Busy Bee Cleaners.

The U.S. Environmental Protection Agency's Risk Assessment Guidance for Superfund (RAGS) Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments), Interim, January 1998, defines an exposure pathway as the course a chemical takes from the source to the exposed individual. An exposure pathway analysis links the sources, locations, and types of environmental releases with population locations and activity patterns to determine the significant pathways of human exposure.

Standard Table 1, Selection of Exposure Pathways, included as Appendix A of this report, presents the potential current and future exposure pathways that will be considered at the Site and summarizes the site conceptual model. Standard Table 1 presents the scenario time frame, the medium that will be considered, the exposure medium, the exposure point, the receptor population, the receptor age, the exposure route, the type of analysis, and the rationale for selection or exclusion of exposure pathway.

The aquifer underneath the site will be considered for the groundwater medium for future scenarios because future onsite residents may rely on wells drawing from the aquifer. There are no nearby residents currently known to be using the groundwater.

9.0 PRELIMINARY REMEDIATION GOALS

The purpose of this section is to present a list of preliminary remediation goals (PRGs) for the preliminary list of chemicals of potential concern (COPCs) detected during past sampling activities at the Site.

Chemical-specific PRGs are concentration goals for individual chemicals for specific media and land use combinations at CERCLA sites. There are two general sources of chemical-specific PRGs:

- Concentrations based on ARARs
- Concentrations based on risk assessment

The recommended approach for developing remediation goals is to identify PRGs at scoping, modify them as needed at the end of the RI or during the FS based on site-specific information from the baseline risk assessment, and ultimately select remediation levels in the Record of Decision (ROD).

ARARs include concentration limits set by environmental regulations. Chemical-specific ARARs are evaluated as PRGs because they are readily available and provide a preliminary indication about the goals that a remedial action may have to obtain. PRGs are risk-based calculations that set concentration limits using carcinogenic and/or noncarcinogenic toxicity values under specific exposure conditions. Risk-based PRGs are presented in Table 9.1 for the Site. Preliminary chemical-specific ARARs identified for the site are presented in Section 6.4. Typically, risk-based PRGs are more protective than chemical-specific ARARs.

As indicated in the EPA guidance document entitled "Risk Assessment Guidance for Superfund (RAGS), Human Health Evaluation Manual, Part B: Development of Risk-Based Preliminary Remediation Goals" (OSWER Directive 9285.7-01B), the following steps have been followed for the development of the PRGs for this site:

- Identify the medium of potential concern;
- Develop an initial list of COPCs;
- Identify the most appropriate land use, potential receptors, and exposure media for the site;
- Identify exposure assumptions; and
- Identify PRGs

9.1 MEDIA OF POTENTIAL CONCERN

The conceptual exposure pathway analysis completed for the site and presented in the preceding section of this report has identified the medium of potential concern for the site. The medium of potential concern is limited to groundwater, and as a result the aquifer, which is located underneath the site, will be considered for the groundwater medium for current and future scenarios since both current and future onsite residents as well as construction and industrial workers may rely on this aquifer as a water source.

9.2 INITIAL LIST OF COPCs

COPCs have been identified based on a review of historical data from the 1994 Site Assessment conducted by REAC/Roy Weston, Inc., and the 1997 Preliminary Report, also completed by REAC/Roy Weston, Inc. COPCs have been selected for the PRG evaluation if they were detected in any media sampled previously, including soil, groundwater, surface water and sediment. Table 9-1 presents a list of COPCs for the site.

9.3 RECEPTORS AND EXPOSURE MEDIA

The following receptors have been identified:

- Commercial and Industrial Workers (Current and Future) - Potential exposure to groundwater
- Residents - (Current and Future) - Potential exposure to groundwater

9.4 EXPOSURE ASSUMPTIONS

EPA standard exposure assumptions are considered appropriate for the Vienna PCE site at this time.

9.5 IDENTIFICATION OF PRGs

Medium-specific PRGs have been identified for all COPCs identified and are listed on Table 9-1. Risk-based PRGs identified on the table were obtained from EPA Region III's Risk-Based Concentration (RBC) Table (April, 2000). The RBC Table provides risk-based concentrations for nearly 450 chemicals. Toxicity values obtained from the Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), and other EPA sources have been combined with standard exposure scenarios to calculate RBCs - chemical concentrations corresponding to a fixed level of risk (i.e., a hazard quotient of one, or a lifetime cancer risk of 10^{-6}, whichever occurs at a lower concentration) in water, air, and soil.

For the Baseline Risk Assessment, risk-based screening will use hazard quotients of 0.1 to accommodate possible additive effects of noncarcinogens, consistent with EPA Region III Screening Guidance.

TABLE 9-1

Preliminary Remediation Goals - Groundwater
Vienna PCE

Contaminant	Risk-Based PRG[1] Tap Water (µg/l)
Benzene	3.2E-001
1,1-Dichloroethene	4.4E-002
Tetrachloroethylene	1.1E+000
Toluene	7.5E+002
Trichloroethylene	1.6E+000
Vinyl chloride	1.9E-002

1. EPA Region III Risk-Based Concentration Table, April 2000.

APPENDIX A

SELECTION OF EXPOSURE PATHWAYS

APPENDIX A

SELECTION OF EXPOSURE PATHWAYS

Vienna PCE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Municipal/Residential Well Water	Resident	Adult	Dermal Absorption	On-site	Quant	Residents use either private wells or municipal water (which draw on the same aquifer) for drinking water.
						Ingestion	On-site	Quant	Residents use either private wells or municipal water (which draw on the same aquifer) for drinking water.
					Child	Dermal Absorption	On-site	Quant	Residents use either private wells or municipal water (which draw on the same aquifer) for drinking water.
						Ingestion	On-site	Quant	Residents use either private wells or municipal water (which draw on the same aquifer) for drinking water.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	Potential exposure to industrial workers if groundwater is used at an industrial facility.
						Ingestion	On-site	Quant	Potential exposure to industrial workers if groundwater is used at an industrial facility.
				Construction Worker	Adult	Dermal Absorption	On-site	Quant	Potential exposure to construction workers who install monitoring wells.
						Ingestion	On-site	None	Ingestion scenario unlikely for onsite workers.
		Air	Municipal/Residential Well Water	Resident	Adult	Inhalation	On-site	Quant	Residents use either private wells or municipal water (which draws on the same aquifer) for drinking water.
					Child	Inhalation	On-site	None	Children six and under are assumed not to shower.
Future	Groundwater	Groundwater	Municipal/Residential Well Water	Resident	Adult	Dermal Absorption	On-site	Quant	Future onsite residents may be exposed to contaminated groundwater.
						Ingestion	On-site	Quant	Future onsite residents may be exposed to contaminated groundwater.
					Child	Dermal Absorption	On-site	Quant	Future onsite residents may be exposed to contaminated groundwater.
						Ingestion	On-site	Quant	Future onsite residents may be exposed to contaminated groundwater.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	Potential exposure to industrial workers if groundwater is used at an industrial facility.
						Ingestion	On-site	Quant	Potential exposure to industrial workers if groundwater is used at an industrial facility.
				Construction Worker	Adult	Dermal Absorption	On-site	Quant	Potential exposure to construction workers due to sampling of monitoring wells.
						Ingestion	On-site	None	Ingestion scenario unlikely for onsite workers.
		Air	Municipal/Residential Well Water	Resident	Adult	Inhalation	On-site	Quant	Future onsite residents may be exposed to volatiles while showering.
					Child	Inhalation	On-site	None	Children six and under are assumed not to shower.